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Superstition as a psychological placebo in top sport

Schippers, M.C.; van Lange, P.A.M.

published in

Journal of Applied Social Psychology
2006

DOI (link to publisher)

[10.1111/j.0021-9029.2006.00116.x](https://doi.org/10.1111/j.0021-9029.2006.00116.x)

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Schippers, M. C., & van Lange, P. A. M. (2006). Superstition as a psychological placebo in top sport. *Journal of Applied Social Psychology*, 36, 2532-2553. <https://doi.org/10.1111/j.0021-9029.2006.00116.x>

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The Psychological Benefits of Superstitious Rituals in Top Sport: A Study Among Top Sportspersons¹

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The current research addresses the psychological benefits of superstitious rituals in top sport, examining the circumstances under which top-class sportspersons are especially committed to enacting rituals prior to a game (ritual commitment). Consistent with the hypotheses, findings revealed that ritual commitment is greater when (a) uncertainty is high rather than low; and (b) importance of the game is high rather than low. Complementary analyses revealed that the state of psychological tension mediated both effect of importance and uncertainty on ritual commitment. Moreover, players with an external locus of control exhibited greater levels of ritual commitment than did players with an internal locus of control. The results are discussed in terms of the tension-regulation function of superstitious rituals in top sport.

Some football players want to enter the field first, others want to enter the field last, whereas still others want to touch the grass just upon entering the field. And yet some players want to wear the same shirt, the same clothes, or even the same underwear for a long series of matches. It is not difficult to list more examples of what may be termed *superstitious rituals*. In fact, most sportspersons seem to be at least somewhat superstitious, especially those who are performing at the top.

Why is it that seemingly sane sportspersons sometimes act in rather unusual ways before a match? Do they need to engage in such acts in every match? Does it also depend on the team for which they are playing? And does it matter whether the stakes are high or low? The present research

¹The authors thank Edwin Lieben and Kees van den Bos for their helpful comments on an earlier version of this manuscript, and Peter Dekker for his statistical advice.

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addresses these questions, thereby seeking to illuminate the broader psychological benefits that top sportspersons may derive from engaging in rather unusual behaviors.

Superstitious Rituals: Broad Explanations

Superstitious rituals are defined as unusual, repetitive, rigid behavior that is perceived to have a positive effect by the actor, whereas in reality there is no causal link between the behavior and the outcome of an event (Womack, 1992). Superstitious rituals differ from a normal routine in that the person gives the action a special, magical significance. However, the distinction between superstition and preparing for the game is not always clear.

As noted by Vyse (1997), "It is often difficult to draw the line between superstition and useful preparation" (p. 90). For some superstitious rituals, it is easy to see that they have no function in a useful preparation, but most superstitions are difficult to distinguish from preparing for performance. A function of rituals might be preparing mentally for each performance. In this sense, rituals seem to serve a rational and useful purpose (cf. Neil, 1980).

How does this superstitious behavior originate and why does it continue? Several possible behavioral and cognitive explanations for superstitious behavior may be advanced. First, one line of reasoning may be derived from classic work by Skinner (1948, 1953), who discovered that superstitious behavior can arise through conditioning. In one of his famous experiments on operant conditioning, Skinner (1948) gave pigeons in the so-called "Skinner box" food at irregular intervals. Hence, it was left to chance as to what kind of behavior was being reinforced. The results were astonishing. The pigeons kept doing what they did at the moment that the food was administered. For example, a pigeon that had just turned its head continued turning its head; and a pigeon that happened to walk around continued walking around. The behavior was difficult to unlearn because the reinforcement (i.e., food) was administered at irregular intervals. Skinner (1948) labeled this curious behavior *superstitious*, arguing that "The bird behaves as if there were a causal relation between its behavior and the presentation of food" (p. 171). In a later article (Skinner, 1953), he suggested that seeing a causal relationship between behavior and the "consequences" also could explain the occurrence and maintenance of superstition in humans.

A second, complementary explanation may be derived from Langer and colleagues' (Langer, 1975, 1977; Langer & Roth, 1975) work on illusion of control. Langer stated that, in general, people are inclined to see themselves as a cause, even in situations in which they are not influencing the situation. This explanation holds that people carry out superstitious behaviors in order

to influence situations in which, in reality, they have no control. According to Langer, this is especially true in situations in which chance as well as skill play a role. In competitive sports, there is always a mixture of chance as well as skill that determines the outcome of a match. Therefore, in these situations, people will probably be more prone to the illusion of control and superstition.

Several explanations may be provided to account for the inclination to see control (often taking the form of ability or skill) in an event in which outcome is completely determined by chance. A first possibility is that people are inclined to see a causal link between their actions and outcomes, when in fact there is none. This explanation is similar to what Skinner (1948) concluded from his research on pigeons.

A second explanation is that people suppose that the world is fair (i.e., just-world hypothesis; Lerner, 1965). The *just-world hypothesis* states that people have a need to believe that their environment is a just and orderly place in which people usually get what they deserve and deserve what they get. By fostering this illusion, people can behave as if chance plays no part, and only a direct relationship between behavior and the consequences of behavior exists.

A third, more attributional explanation holds that people are generally inclined to attribute success to their skills and abilities, and to attribute failure to external circumstances (Feather, 1969). This might be the reason why people are inclined to attribute positive outcomes mistakenly to their skills and abilities, which in reality occur as a result of luck. Thus, people may by nature be inclined to confuse skill and chance, which may explain why people think that they can influence chance or fate by carrying out superstitious rituals.

Situational and Personal Determinants of Superstitious Rituals

The central purpose of the present research is to examine the circumstances under which superstition will be most pronounced, and to examine individual differences in the extent to which people feel the need to carry out superstitious rituals. When will people be most prone to developing superstitious rituals? We argue that people carry out rituals in an uncertain situation; in which the outcome is not only uncertain, but the outcome also is important to them. Another question is whether differences in personality will influence the extent to which people feel the need to carry out rituals. We argue that people who differ in locus of control—the extent to which people see the environment as controllable—also differ in the extent to which they feel tension and are self-confident before a game and hence differ in the extent to which they are inclined to be superstitious.

Uncertainty and Importance of the Outcome

An assumption underlying the present research is that the enactment of superstitious rituals serves the function of reducing psychological tension. It should be clear that prior to a game, top sportspersons will experience psychological tension, as the game by itself should activate several specific feelings (e.g., feeling restless), thoughts (e.g., self-doubts), or physiological responses (e.g., trembling) that are captured by the concept of psychological tension. We suggest that psychological tension generally will vary from opponent to opponent and from game to game.

To begin with, given that top sport is about winning versus losing, the standing of the other team (i.e., the opponent) relative to one's own team should be an important ingredient in uncertainty. If one is quite confident that one will beat the opponent, then the uncertainty should be low. However, if the other team is equally good or superior to one's own team then the uncertainty should be high. Hence, we assume that the relative standing of the opponent causes uncertainty, such that uncertainty is high when the opponent is of equal or superior standing, but relatively low when the opponent is of inferior standing. As a result, psychological tension should be greater when the opponent is at least as good as one's own team.³

Indeed, there is evidence suggesting that uncertainty regarding future outcome is an important determinant of superstition. For example, it often has been assumed that the illusion of control tends to be more pronounced for situations in which not only skill but also chance play a substantial role (Langer, 1975, 1977; Langer & Roth, 1975). It has been argued that people may react to uncertain and unpredictable situations with superstitious beliefs or actions (e.g., Malinowski, 1955; Vyse, 1997), thereby suggesting that superstitious rituals are more likely or more pronounced, as situations are characterized by more uncertainty regarding the outcome. However, as far as we know, there is virtually no research that is of direct relevance to the link between uncertainty and superstition. The only research that we were able to locate was a study by Bleak and Frederick (1998), which examined the effects of sport anxiety (i.e., involving measures of somatic anxiety,

³One could argue that the condition of "playing an equal opponent" should be exactly in between the conditions of playing a superior opponent or an inferior opponent. However, we expect greater ritual commitment when playing an equal opponent or a superior opponent, rather than an inferior opponent. This expectation is based partially on the notion that losses loom larger than gains and that people are oriented more strongly toward minimizing losses than toward maximizing gains (e.g., Kahneman & Tversky, 1984). We suggest that the possibility of losing, coupled with the belief that one is able to minimize the likelihood of a loss, is relatively higher when playing an equal team or a superior team. Hence, level of uncertainty (and, as a consequence, level of ritual commitment) should be greater when playing an equal or a superior team, rather than playing an inferior team.

worry, and concentration disruption) on overall use of superstitious behavior. However, this research did not reveal any significant effects of sport anxiety on the overall use of superstitious behavior.

In addition to uncertainty regarding outcomes, we suggest that superstition also should be affected by the importance attached to the outcome in a given situation. When outcomes are not considered to be very important, individuals should feel more or less relaxed, and the level of psychological tension should be low. In contrast, when outcomes are considered to be very important, people generally should experience greater psychological tension (e.g., feeling nervous and restless, having obsessive thoughts about the game, having increased blood pressure). For example, sportspersons typically experience greater psychological tension when playing in the finals than when playing a training match. As a result, tendencies toward superstition should be greater when the importance of the outcome is high rather than low.

While this line of reasoning seems plausible (cf. Vyse, 1997), to our knowledge there is no research that has assessed the link between importance and superstition. In fact, we know of only one study investigating the effect of the importance of success on the use of superstitious behavior (Bleak & Frederick, 1998). Bleak and Frederick revealed that the importance of success was unrelated to the overall use of superstitious behavior, but it was related to the degree to which they reported engaging in specific rituals.

Perhaps more indirect evidence can be derived from research focusing on *self-enhancement*, which is the tendency to believe that one is better than and not as bad as others (cf. Sedikides & Strube, 1997). For example, tendencies toward self-enhancement are stronger for situations (or characteristics) that are considered to be more important (e.g., Greenwald, 1980; Rusbult, Van Lange, Yovetich, Wildschut, & Verette, 2000; Van Lange, 1991) or more threatening to the self (cf. Taylor & Brown, 1988) than for situations that are considered less important or less threatening. While preliminary, the previously discussed lines of research add credence to the possibility that individuals are more likely to engage in superstitious rituals to the extent to which a situation is characterized by greater uncertainty and to the extent to which outcome is more important to the person.

It is important to note that in the one study that examined uncertainty and importance, Bleak and Frederick (1998) measured individual uncertainty and ratings of importance, rather than uncertainty and importance as key features of the situation. That is, they did not compare different situations that presumably differ in terms of uncertainty or importance. The present research seeks to extend this research by focusing on situational differences that are experienced by nearly every sportsman. That is, by comparing different situations systematically, the current research examines the effects of situational uncertainty as well as the importance of the goals to

be reached on the extent to which participants are committed to engaging in rituals. In other words, the extent to which they wish or need to engage in ritual, which we refer to as *ritual commitment*.

Situational uncertainty and importance will be manipulated by means of six scenarios in which situations of matches will be described. Situational uncertainty will be operationalized as relative standing. It is assumed that participants will feel more uncertainty playing a superior or an equal opponent versus a rather weak opponent. Importance is operationalized in terms of the nature of the game that the team must play: the finals (i.e., the importance of the outcome is high) versus a training match (i.e., the importance of the outcome is low).

Thus, ritual commitment is expected to vary as a function of both uncertainty and importance of the situation. Moreover, we hypothesize that these effects will be mediated by psychological tension. That is, we expect that psychological tension will be enhanced by relative standing, as well as by the importance attached to the outcome, and that both effects can account at least partially for their effects on ritual commitment.

Locus of Control

Considerable research has revealed that individuals differ in the extent to which they perceive the environment as controllable. Individuals with an internal locus of control (i.e., internals) are inclined to see events as the consequence of their actions, whereas individuals with an external locus of control (i.e., externals) are inclined to see the same events as unrelated to their actions and, rather, as a consequence of luck, chance, fate, powerful others, or as unpredictable (Rotter, 1966).

The concept of locus of control is related strongly to social learning theory. For example, Strickland (1989) argued that internal and external orientations of people have to do with "generalized expectancies that reflect consistent individual differences among individuals in the degree to which they perceive contingencies or independence between their behavior and subsequent events" (p. 1). The concept is one of the most widely explored concepts in many areas of psychology, and it has been associated with behaviors as diverse as social action (Gore & Rotter, 1963; Sank & Strickland, 1973; Strickland, 1965), coping with diseases (Reid, 1984), divorce (Statlender, 1983), boredom (Schippers, 1998), health-related behaviors (Strickland, 1978), conformity (Crowne & Liverant, 1963), and job involvement (Reitz & Jewell, 1979; for reviews, see Furnham & Steel, 1993; Lefcourt, 1976, 1981, 1983, 1984; Strickland, 1989). The general pattern is that, relative to externals, internals experience greater levels of control, lower levels of learned helplessness (when challenged), and engage more

actively in several coping strategies when problems arise (Benassi, Sweeny, & Dufour, 1988; Seligman & Maier, 1967).

However, it is surprising that past research on the relationship between locus of control and superstition has not yielded unequivocal findings. Although most researchers have found that externals are more prone to engage in superstitious rituals (Tobacyk & Milford, 1983; also see Vyse, 1997), there is evidence in support of the opposite position (Van Raalte, Brewer, Nemeroff, & Linder, 1991). We suggest that two lines of reasoning can be advanced to account for these contradictory findings. The first line of reasoning is that externals rely more on superstitious behavior. The rationale for this line of reasoning is that because externals ascribe more control to external factors, they may experience a stronger need to engage in superstitious rituals in order to "influence luck."

The second line of reasoning indicates that internals will rely more on superstitious behavior. The rationale for this line of reasoning is that internals who are experiencing greater control, as well as exhibiting greater illusion of control, will try to make the situation more controllable by carrying out superstitious rituals. We know of only one (albeit very interesting) study that provides some preliminary evidence in support of this line of reasoning. In that study, Van Raalte et al. (1991) first assessed locus of control and then asked participants without experience with playing golf to putt a golf ball. Participants were free to choose a golf ball from four colors and had 50 putts each. Superstitious behavior was operationalized in this study as the extent to which participants chose the same colored golf ball for the next putt after having made a putt. It was found that participants who believed that their actions could control chance were more likely to choose the same colored "lucky" ball after a successful putt, hence suggesting that internals are more inclined to engage in superstitious ritual than are externals.

Based on the previously discussed lines of reasoning and empirical evidence, we advance two competing hypotheses. One hypothesis is that externals will feel more tension and will exhibit greater ritual commitment than will internals. The other hypothesis is that internals will feel more tension and will exhibit greater ritual commitment than will externals.

Research Overview and Hypotheses

The major purpose of the present research is to examine the situational (relative standing and importance) and person-related (locus of control) determinants of ritual commitment among top-class sportspersons. Relative standing and importance are manipulated in six realistic scenarios. In examining relative standing, we varied three opponents that participants

would face in a match: an opponent that is believed to be inferior, equal, or superior to their own team whereby relative standing was based on past performance. We propose that uncertainty (and psychological tension) will be greater when the opponent is superior or equal to their own team than when the opponent is inferior to their own team. In examining importance, we varied between a very important match (i.e., the finals) and an unimportant match (i.e., a training match). Hence, the six scenarios systematically manipulate the relative standing (superior, equal, or inferior) and the importance of the match (finals vs. training match).

To summarize, we advance the following hypotheses.

Hypothesis 1. When the relative standing of the opponent is either superior (high uncertainty) or equal (moderate uncertainty), sportspersons will be higher on ritual commitment than when the relative standing of the opponent is inferior (low uncertainty).

Hypothesis 2. Level of ritual commitment will be higher when the importance of the outcome is high rather than low.

Regarding the link between locus of control and ritual commitment, the following competing hypotheses are proposed:

Hypothesis 3a. Externals will exhibit greater levels of ritual commitment than will internals.

Hypothesis 3b. Internals will exhibit greater levels of ritual commitment than will externals.

Finally, as alluded to earlier, we expect the following:

Hypothesis 4. The extent to which people experience psychological tension before a match will mediate the predicted effects of uncertainty and importance on ritual commitment.

In a more exploratory vein, we examine whether psychological tension will illuminate the potential association between locus of control and ritual commitment.

Method

Participants and Experimental Design

One hundred ninety-seven top-class sportspersons (145 men, 52 women) from 23 top-ranking Dutch football (e.g., Ajax, PSV, Willem II), volleyball

(e.g., Piet Zoomers/Dynamo), and hockey clubs (e.g., the Amsterdam Hockey and Bandy club) participated in this study. The age of players varied between 15 and 35 years (M age = 24 years). The experimental design of this study was tested in a 3 (Relative Standing: superior, equal, or inferior) \times 2 (Importance of Outcome: high vs. low) \times 2 (Locus of Control: internal vs. external) factorial design, with relative standing and importance of outcome as within-participant variables and locus of control as a between-participants variable.

Procedure

Participants were recruited by contacting the trainers/coaches of top-ranking sport teams. Top-ranking sport teams were chosen because it was assumed that on those teams, superstitious rituals would be most pronounced (see Neil, Anderson, & Sheppard, 1981).⁴ All but one of the contacted clubs agreed to participate. Only one player refused to complete the questionnaire, yielding a nearly 100% response rate.

Participants were informed that they would be questioned about their superstitions. They then completed a questionnaire. This took place in the player's home or canteen. For two clubs and one national team, questionnaires were sent by mail.

Questionnaires

Locus of control. Locus of control (Andriessen, 1971; Rotter, 1966) was measured by way of 12 items. A sample item is "Even if you do your utmost, without luck things will not succeed." The items were rated on a 6-point scale ranging from 1 (*not at all true*) to 6 (*true*). Cronbach's alpha for the 12 items was .72.

Superstition. Superstition was measured in several ways. An open question about superstitious rituals asked "What rituals do you perform before a game?" This question was designed to determine the kind and amount of superstition among sportspersons.

Furthermore, two Likert-type questions assessed the extent to which participants perceived themselves as superstitious. These questions are "How superstitious do you find yourself in comparison to other sportspersons?" and "How superstitious do other sportspersons find you?" These

⁴One could argue that players of top-ranking clubs will find it important to win in all situations. In that case, no difference with respect to superstition would be found in different situations. However, as will be described in the Results, we found differences in how much importance players attached to winning for different kinds of matches.

items were rated on a 6-point scale ranging from 1 (*not at all superstitious*) to 6 (*very superstitious*). Responses to these questions were highly correlated ($r = .69, p < .001$). Thus, the two items were collapsed to form a two-item scale of self-rated superstition.⁵

Vignettes. The present study includes six vignettes that ask participants to imagine a certain match. By means of the vignettes, relative standing and importance of outcome were manipulated.

Relative standing was manipulated by varying the relative strength of the fictitious opposing team. The vignette stated that it was either a team against which their team has lost many of the previous matches (superior opponent), a team against which their team has won as often as it has lost (equal opponent), or a team against which their team has won most of the matches (inferior opponent).

Importance of the outcome was manipulated by the type of match the participants were asked to imagine. Participants were asked either to imagine that they were about to play the finals (high importance) or to play a training match (low importance).

A sample vignette is "Imagine that you play in the finals. You will be playing another team against which your team has usually lost (e.g., lost seven times, won only once, and the match ended in a draw twice)." This sample vignette outlines the high-importance/superior-opponent condition. The questionnaire for the volleyball teams was slightly adjusted in that the team, for instance, lost nine times and won only once, because a draw is not possible in volleyball.

Following each vignette, seven Likert-type questions were asked. The first three questions were manipulation checks. In order to check if the given situations were recognizable, the first question asked whether participants could imagine the vignette for themselves on a 6-point scale ranging from 1 (*absolutely not*) to 6 (*absolutely*). The second manipulation check asked whether participants expected to win or lose the fictitious match, which was rated on a 6-point scale ranging from 1 (*lose for sure*) to 6 (*win for sure*). The final manipulation check asked how important it was for participants to win the match, which was rated on a 6-point scale ranging from 1 (*not at all important*) to 6 (*very important*). In order to assess *psychological tension* in each situation, participants were asked to rate how tense they were before the match on a 6-point scale ranging from 1 (*not at all*) to 6 (*very*).

⁵As a result of missing values on one of the measures, and to use the same sample in all analyses, we disregarded the data of 29 participants. Alternative treatment of missing values (e.g., disregarding data per measure) yielded virtually identical findings. Hence, all analyses are based on a sample of 158 participants.

Ritual commitment. Ritual commitment was assessed by two questions. The first question asked how annoying participants thought it was if, for whatever reason, they were not able to carry out the rituals they mentioned before. This item was rated on a 6-point scale ranging from 1 (*not at all annoying*) to 6 (*very annoying*). The second question asked how important it was to participants to carry out the rituals they mentioned before. This item was rated on a 6-point scale ranging from 1 (*not at all important*) to 6 (*very important*). Responses to the two questions were significantly correlated (r_s varied from .83 to .90; all $ps < .001$). Thus, the responses to these two questions were averaged in subsequent analyses.

Demographics. Demographic questions regarded age, gender, level of education, and nationality.

Results

Manipulation Checks

We conducted a 2 (Importance: high vs. low) \times 3 (Relative Standing: inferior vs. equal vs. superior) \times 2 (Locus of Control: internal vs. external) univariate ANOVA. Ability to imagine the situation outlined in the vignette (judgments of realism) and expectations regarding winning or losing and importance attached to winning, respectively, were dependent variables.

Judgments of realism. The results reveal that participants were quite able to imagine the situations outlined in the vignettes (overall $M = 4.64$). A main effect for the extent to which participants were able to imagine the situation shows that participants were best able to depict the situation playing against an inferior opponent ($M = 4.99$). The situation playing against an equal opponent could be imagined to a lesser extent ($M = 4.66$); and the situation playing against a superior opponent could be imagined least well ($M = 4.28$), $F(1, 152) = 43.75$, $p < .001$. This may be because top-ranked clubs are more likely to face an inferior opponent than a superior or even equal opponent. Moreover, such judgments also may be subject to mechanisms causing unrealistic or illusory forms of superiority. No further effects were found to be significant.

Expectations of winning versus losing. For the question about whether participants expected to win or lose the fictitious match, a main effect for relative standing reveals that they were less confident of winning when facing a superior opponent ($M = 4.43$) than when facing an inferior opponent ($M = 5.52$), with intermediate levels when facing an equal opponent ($M = 5.14$), $F(1, 152) = 202.97$, $p < .001$. These findings are perfectly consistent with the intended manipulation of relative standing, although it seems that people were quite confident of winning, even when facing a superior opponent.

Interestingly, though descriptively much smaller than the previously mentioned effect, a main effect for importance reveals that when importance of outcome was high (i.e., playing finals) participants had higher expectations of winning ($M = 5.10$), than when importance of outcome was low (i.e., playing a training match) ($M = 4.97$), $F(1, 152) = 6.15$, $p < .05$. No further effects were found to be significant.

Importance of winning. For the question about how important it is for participants to win the match, a main effect for importance reveals that participants found it more important to win the game when importance of the outcome is high (i.e., playing finals; $M = 5.68$) rather than low (i.e., playing a training match; $M = 4.69$), $F(1, 155) = 117.62$, $p < .001$. No other effects were found to be significant. Hence, the findings are perfectly consistent with the intended manipulation of importance of outcome.

Descriptive Statistics: Prevalence of Superstitious Rituals

There were 158 participants (80.3%) who mentioned one or more superstitious rituals they perform before a game, with a mean of 2.6 rituals per person. The kinds of rituals they mentioned vary from wearing the same shoes for every match to eating four pancakes before a home match. Participants mentioned some striking rituals, such as putting a piece of chewing gum in a trampled part of the football pitch, wearing shin guards all the way from home to the place of the game (even when the participant had to wear them for over 70 miles), having to see the number 13 at least once before the game, kissing a football shirt, and smoking a cigarette in the morning before the game. An overview of recurring rituals mentioned by the sportspersons is presented in Table 1. From these results, it can be concluded that superstitious rituals are common among top-class players. No differences in kinds or amount of rituals were found between the three sports.

As can be seen in Table 1, it is often difficult to distinguish superstitious rituals from useful preparation. As a case in point, participants often mentioned that they completed the preparation before the game in a fixed order. Some even described in minute detail all the rituals they performed before the game, from 9:00 a.m. until the onset of the game in the evening. If the ritual consisted of eating special food, they often described the food in detail (i.e., eating steak with mushrooms, two slices of bread with cheese, drinking Red Bull).

Warm-up rituals also were abundant. Participants often mentioned that they would complete the exercises in a fixed order or practice with a set teammate. If they were not able to carry out these rituals, they would feel unhappy about it. Some even mentioned that "Things would definitely go wrong" if they did not carry out their rituals. Idiosyncratic rituals, which

Table 1

Recurring Rituals Mentioned by Participants

Ritual	Number of times mentioned			
	Football (<i>N</i> = 97)	Volleyball (<i>N</i> = 52)	Hockey (<i>N</i> = 48)	Total (<i>N</i> = 197)
Eat special food	43	10	13	66
Be involved in relaxing activities (e.g., watch TV, go for a walk)	42	4	5	51
Enter the field in a prescribed order, fixed place in dressing room, arrive at the stadium in a fixed order (first, second)	30	10	6	46
Wear special clothes (e.g., swimming trunks under football pants)	16	12	23	51
Go to bed early	15	1	3	19
Dress in a special order	13	6	8	27
Warm up (e.g., in a special place, same order of exercises)	12	4	7	23
Take the time for pregame activities	11	7	7	25
Look after equipment (e.g., polish shoes)	10	2	6	18
Do things in a fixed order	8	2	3	13
Personal care (e.g., not shaving, paint nails)	7	4	8	19

Table 1. Continued

Ritual	Number of times mentioned			
	Football (<i>N</i> = 97)	Volleyball (<i>N</i> = 52)	Hockey (<i>N</i> = 48)	Total (<i>N</i> = 197)
Go to the toilet (e.g., fixed time, fixed number of times)	7	2	5	14
Interpersonal rituals (e.g., wish everyone good luck one by one, fixed roommate, hit goalie's leg guards)	4	4	11	19
Get up at a set time	4	1	5	10
Stay home evening before the game	4	1	1	6
Eat in a special place	3	2	2	7
Drive a set route to the stadium	3	0	0	3
Celibacy before the game	2	0	1	3
Pray/cross oneself	2	0	1	3
Other (e.g., call upon deceased, kiss shirt, put car in same place)	11	5	10	26
Total	247	77	125	449

can be seen as “pure” rituals because they have nothing to do with useful preparation for the game, are mentioned under the heading of “Other” in Table 1 because these are often quite unique, and therefore do not fit under the other headings.

Effects of Relative Standing, Importance, and Locus of Control

To test Hypotheses 1 through 3, we conducted a 3 (Relative Standing: superior, equal, or inferior opponent) \times 2 (Importance: high vs. low) \times 2

(Locus of Control: internal vs. external) ANOVA on ritual commitment. Consistent with Hypothesis 1, this analysis reveals a main effect for relative standing, $F(2, 312) = 14.83$, $p < .001$, indicating that when playing a superior ($M = 3.01$) or equal opponent ($M = 2.98$), ritual commitment is higher than when playing an inferior opponent ($M = 2.84$). As a more direct test of Hypothesis 1, planned comparisons reveal a significant contrast of inferior opponent versus equal opponent and superior opponent, $F(1, 156) = 14.83$, $p < .001$.

Consistent with Hypothesis 2, a main effect for importance of outcome reveals that when importance was high ($M = 3.27$), ritual commitment was higher than when importance was low ($M = 2.61$), $F(1, 156) = 65.20$, $p < .001$. There were no significant interaction effects.

Finally, we advanced competing hypotheses regarding the link of locus of control with ritual commitment. Consistent with Hypothesis 3a (and inconsistent with Hypothesis 3b), the analysis reveals that externals ($M = 3.20$) exhibited greater levels of ritual commitment than did internals ($M = 2.69$), $F(1, 156) = 5.29$, $p < .05$. Thus, individuals who are prone to believe that outcomes are externally determined (rather than determined by themselves) exhibit greater ritual commitment.

Mediating Role of Psychological Tension

In Hypothesis 4, we predicted that psychological tension would mediate the effects of uncertainty (caused by variation in relative standing) and importance, and suggested that it might mediate the link between locus of control and ritual commitment. To test mediation, we first need to examine the effects of the independent variables (i.e., relative standing, importance, and locus of control) on psychological tension: the presumed mediating variable. Hence, we conducted a 2 (Importance: high vs. low) \times 3 (Relative Standing: superior, equal, or inferior opponent) \times 2 (Locus of Control: internal vs. external) univariate ANOVA on psychological tension. The analysis reveals that all of the effects were significant and were in a manner consistent with the hypothesis.

First, a main effect for relative standing, $F(2, 312) = 27.32$, $p < .001$, reveals greater levels of tension for a superior opponent ($M = 3.25$) or an equal opponent ($M = 3.28$) than for an inferior opponent ($M = 2.90$). As a more direct test, planned comparisons reveal a significant contrast of inferior opponent versus equal opponent and superior opponent, $F(1, 156) = 32.32$, $p < .001$. Second, a main effect for importance, $F(1, 156) = 89.58$, $p < .001$, reveals greater levels of tension when importance was high ($M = 3.52$), rather than low ($M = 2.76$). Finally, a main effect for locus of control, $F(1, 156) = 4.88$, $p < .05$, reveals that participants with

an external locus of control ($M = 3.31$) exhibited greater tension than did individuals with an internal locus of control ($M = 2.98$). There were no significant interaction effects.

Next, we conducted a 3 (Relative Standing) \times 2 (Importance of Outcome) \times 2 (Locus of Control) ANOVA in which we included psychological tension as a covariate. This analysis reveals, first, that the F value associated with the contrast of an inferior opponent versus a superior opponent and an equal opponent dropped from $F(1, 156) = 14.83$, $p < .001$ (in the previous analysis without the covariate) to $F(1, 155) = 7.01$, $p < .001$. The mediator (psychological tension) caused a significant decline in the strength of the effect of uncertainty ($Z = -3.23$, $p < .005$). Second, the analysis reveals that the F value of the effect of importance of outcome declined from $F(1, 156) = 65.20$, $p < .001$ (in the previous analysis without the covariate) to $F(1, 155) = 10.81$, $p < .001$, which is a significant decline ($Z = 5.43$, $p < .001$). Third, the analysis reveals that the effect of locus of control remained significant and did not exhibit a significant decline; from $F(1, 156) = 5.29$, $p < .05$ (without covariate), to $F(1, 155) = 4.58$, $p < .05$ (with covariate), which is not a significant decline ($Z = -1.32$, ns).

Thus, consistent with Hypothesis 4, psychological tension mediated both the effect of uncertainty (caused by variations in relative standing) and the effect of importance of the outcome. In both cases, we found significant mediation, even though the effect remained significant, which is evidence in support of partial mediation. The effect of locus of control was not mediated by psychological tension. Taken together, the present findings suggest that external circumstances regarding the outcome (importance) and the opponent (relative standing) influence psychological tension, which in turn influence the extent to which an individual wishes to or needs to enact superstitious rituals.

Discussion

The present research examined situational and person-related influences on ritual commitment among sportspersons; that is, the desire or need to enact superstitious rituals before a match. The results provide good evidence in support of most of the hypotheses.

First, consistent with Hypothesis 1, relative to an inferior opponent, an opponent that was believed to be superior or equal to the own team elicited greater levels of ritual commitment. Second, consistent with Hypothesis 2, ritual commitment was greater when the importance of the outcome was believed to be high (i.e., finals), rather than low (i.e., a training match). Third, locus of control appeared to be significantly associated with both ritual commitment and psychological tension, such that relative to externals,

internals exhibited greater levels of ritual commitment and psychological tension (supporting Hypothesis 3a). Finally, consistent with Hypothesis 4, psychological tension appeared to mediate the effects of relative standing and importance on ritual commitment.

The present research makes a unique contribution to the existing literature in that superstition was assessed quantitatively among a large group of top sportspersons, looking at the combined effects of personality and situational differences on superstitious behavior, as well as the mediating effect of psychological tension. These findings are in line with the notion that superstitious behavior will be most pronounced when (a) uncertainty is either high or moderate; (b) importance of succeeding is high; and (c) a person perceives success as dependent on external factors, rather than as being under his or her own control.

Importantly, the finding that psychological tension was found to mediate the effects of relative standing and importance on ritual commitment supports the notion that the functionality of superstition may stem from reducing psychological tension in players. As noted earlier, several theorists have advanced this claim, but the empirical body of knowledge is exceedingly small. Hence, an important contribution of the present research is that it provides empirical support for a compelling argument that is often advanced, but hardly tested.

Moreover, the tension-reducing role of superstitious behavior extends the literature in showing that the conditioning explanation provided by Skinner (1948, 1953), as well as the confusing-skill-with-chance explanation provided by Langer (1975, 1977; Langer & Roth, 1975), can be enriched with the tension-reducing effect of rituals. The conditioning might exist because sportspersons may try to ward off tension by enacting rituals, which may explain why sportspersons hold on to rituals, even when the desired outcome (i.e., winning the game) is not obtained. That is, sportspersons may use rituals as a way to mentally prepare for a game.

The present findings extend the confusing-skill-with-chance argument in that, perhaps, the reduction in psychological tension before a match may be experienced as an important outcome as such. That is, one may speculate that in preparing for a match, the most important concern is to regulate one's own psychological and physical state. Thus, sportspersons *realistically* may see a strong link between enacting superstitious rituals and a desired outcome. This link between enactment of rituals and the outcome of tension reduction may be a stronger cause of ritual commitment than the more distal link between enactment of rituals and the outcome of the match. Such reasoning emphasizes the regulatory function of superstitious rituals, which we believe is important to our understanding of why such rituals may come into being and persist.

We suggest that the tension-regulating function of superstitious rituals may help more often than harm a team member to perform well and contribute to team performance. As a case in point, research by Lobmeyer and Wasserman (1986) indicated that rituals carried out just before taking a free throw during a basketball game appear to influence subsequent performance in a positive way. Moreover, their work suggested that subsequent performance was only promoted in those who believed that the enactment of superstitious rituals would have beneficial effects on performance. This (potentially) illusory effect of rituals on performance is called *psychological placebo* by Neil (1980), who sought to explain the positive effects of rituals in terms of self-fulfilling prophecies and confirmation processes. Rituals "work" because the person believes in them and expects this.

The results of the current study show that superstitious individuals are less self-confident and experience a higher level of psychological tension before a match than do less superstitious persons. These findings indicate that rituals can play a role in reducing psychological tension for sportspersons. Furthermore, these findings support the idea that some perceptual biases (i.e., superstition) may be "highly adaptive under many circumstances" (Taylor & Brown, 1988, p. 205).

One also might argue that the enactment of rituals enhance the probability of reaching the *ideal performance state* (IPS; Garfield & Bennet, 1984; Williams, 1986), which is characterized by feeling relaxed (both mentally and physically), feeling full of energy, experiencing extraordinary awareness, and being focused on the present as well as feeling in control. An ideal performance state often is associated with a disorientation of time and place, and the person has the feeling that things happen in slow motion. These positive states, which parallel the optimal experience of flow (Csikszentmihalyi, 1990, Csikszentmihalyi & LeFevre, 1989), may be expected to help rather than harm performing well, perhaps more so for challenges that are closer in time. The practical implication may be for trainers/coaches to acknowledge the potential benefits of superstitious rituals in terms of tension reduction, and consequently encourage or at least not discourage the enactment of rituals by sportspersons.

Although thus far we have discussed the potential benefits and functionality of the use of rituals, one might argue that the use of rituals can go too far. For instance, some rituals may become obsessive, or too many rituals *must* be carried out: In either event, they may harm rather than help performing. For example, McCallum (1992) described how a player obsessively carried out so many rituals that he lost 12 pounds in 10 days. In an interview (De Lange, 1996), a karate practitioner said that he had the superstitious ritual of touching his pants during a karate tournament. This meant that by doing this, his guard was down for a moment, providing his opponent with an opportunity to score.

In the examples mentioned, rituals might be useful in reducing anxiety, but they could be detrimental to performance. In those cases, it might be better to perform other rituals, with no harmful side effects, which can be carried out under all circumstances. Trainers/coaches should pay attention to the occurrence and development of superstition in players and teams, and should be able to coach and give guidance in this respect as well. Future research could focus on the functionality of different kinds of rituals; for instance, by assessing the effects of type of ritual on tension and performance of sportspersons.

We should briefly outline some limitations of the present research. While the sample is unique in that superstitious rituals should matter most to those who often are faced with high-stakes situations characterized by uncertainty regarding the outcome, it is important to note that all participants were players involved in team sports rather than individual sports. Thus, one should be careful in generalizing the present findings to other samples or other situations.

Perhaps more importantly, the present research used a scenario methodology, which is characterized by some well-known methodological limitations. For example, one may question to some degree whether participants can place themselves in the hypothetical situations (i.e., to "experience" the high-stakes situation), whether tendencies toward favorable self-presentation underlie the present findings, and whether imagined responses in hypothetical situations match actual responses in actual situations. However, some of these limitations do not seem to be crucial. For example, top sportspersons should have little if any problem imagining the hypothetical situations (i.e., the situations should be very real for them), and their willingness to list a substantial number of superstitious rituals would not follow immediately from tendencies toward favorable self-presentation. Nevertheless, it would be desirable for future research to complement this work by examining actual behavior; perhaps by using alternative measures to assess psychological tension (i.e., physiological measures such as heart rate variability), which also should reveal an important mediational role.

Although the enactment of superstitious rituals often does not make sense to observers, it may serve an important tension-regulation function for sportspersons prior to a match. The regulation of psychological tension becomes especially important in situations characterized by uncertainty and high importance. While the enactment of superstitious rituals often is believed to be unrelated to any outcome, the present findings suggest that at least one important outcome is likely to be obtained: regulating psychological tension. This immediate outcome may be very important to subsequent performance; perhaps even more so when the performance is closer in time. As such, the present research contributes not only to extant theorizing about

superstitious rituals, but also to how coaches and fellow team members should judge such rituals: as an inherent part of mental and physical preparation to an important match in which the outcome is rather uncertain.

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